

In re Patent Application of:
CHARLES CARPENTER
Serial No. 09/864,918
Filing Date: 5/24/2001

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Remarks

Applicant and the undersigned would like to thank the Examiner for his guidance and efforts in the examination of this application. Claims 1, 2, 6 -13, 15, 19, and 20 remain in the case. Claims 1,2, 6 - 13, and 15 were objected to because of formalities as viewed by the Examiner and under 35 U.S.C. § 112, second paragraph as being indefinite. As guided by the Examiner, and as fully supported by the specification, Claims 1, 6, 7, and 19 are currently amended to more clearly identify and distinctly claim the subject matter Applicant regard as the invention. Reconsideration is respectfully requested in view of the above amendments and arguments herein presented.

With regard to U.S. Patent No. 5,611,129 to Yoshimoto et al., Yoshimoto '129 teaches a method of assembling piezoelectric oscillators in an array of resinous packages. The piezoelectric element comprises a ceramic bar, a lower electrode film formed on the bottom face of the ceramic bar extending onto one end face of the bar, an upper electrode film on the ceramic bar extending onto the other end of the bar (column 5, lines 25 - 30). Thus, Yoshimoto '129 would appear to only suggest a bulk wave piezoelectric oscillator and not a SAW device as herein claimed. In particular where the SAW device includes a SAW die mounted face down, in a flip-chip arrangement, with the SAW die attached faced down into the cavity of the package, as called for in independent amended Claims 1 and 19.

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As is well known in the art, a typical SAW device includes a transducer having bond pads and interdigitated electrodes being deposited on a surface of a piezoelectric substrate. As is well known by those skilled in the art, flip-chip SAW devices are relatively small. The assembly of such miniature SAW flip-chip devices presents a significantly different set of problems than would be addressed by Yoshimoto '129. By way of example, the alignment of the lids on the array of the packages is not addressed or suggested by Yoshimoto '129.

Further, as is correctly pointed out by the Examiner, Yoshimoto '129 does not teach a process of forming a recess at each cavity to receive the lid. Further, as it is noted that the attachment and interconnecting of the SAW die to arrays are well known, however, they are usually accomplished with resin epoxy that would render the SAW devices non-hermetic. As suggested in the background section of the specification, hermetically sealed SAW flip-chip devices have basically been assembled individually through solder sealing, and never in an array because of the very critical requirements for the attachment of the lids to the package array and the fixturing alignment. It is generally very difficult to maintain the integrity between the external fixture and the array during solder reflow.

U.S. Patent No. 5,471,011 to Maslakow teaches the assembly of a semiconductor chip in a thermoplastic carrier package. The recessed cavity of the carrier package receives a lid that has the same thermoplastic so as to form a homogenous

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package carrier. Maslakov '011 does not address the problems associated with the assembly of an array of SAW die mounted in a flip-chip arrangement and the alignment of the lid fixturing to ensure the proper sealing of the array of SAW devices.

Respectfully, except from the teachings of the Applicant, one of skill in the art would not look to Yoshimoto '129 or Maslakov '011 for solving the problems associated with the assembling of the array of SAW devices in a flip-chip arrangement.

Therefore, Applicant respectfully submits that the above amendments place this application in a condition for allowance, and passage to issue is solicited. The Applicant and the undersigned would like to again thank the Examiner for his efforts in the examination of this application and for reconsideration of the claims as amended in light of the arguments presented. If the further prosecution of the application can be facilitated through telephone interview between the Examiner and the undersigned, the Examiner is requested to telephone the undersigned at the Examiner's convenience.

Respectfully submitted,


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